

NASA TECH BRIEF



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Fluid Properties Handbook

A single source compilation has been made of the most accurate available physical property data pertaining to helium, hydrogen, oxygen, and nitrogen. This handbook is organized as follows:

HELIUM

- Density
- Specific Volume
- Compressibility Factor
- Specific Heat, C_v , C_p
- Specific Heat Ratio C_p/C_v
- Specific Heat, C_s , of Liquid Helium at Saturation
- Viscosity (Gas)
- Thermal Conductivity
- Internal Energy Charts
- Velocity of Sound
- Enthalpy and Entropy Charts
- W/A for Sonic Flow

HYDROGEN

- Vapor Pressure
- Density of Liquid and Gaseous Hydrogen
- Compressibility Factor
- Specific Heat C_p , C_v , and C_s for LH_2
- Specific Heat C_p and C_v for GH_2
- Specific Heat Ratio C_p/C_v
- Viscosity (Liquid and Gas)
- Thermal Conductivity
- Internal Energy Charts
- Velocity of Sound
- Surface Tension
- Heat of Vaporization
- Heat Transfer Rate to Boiling Hydrogen
- Heat Transfer Rate from Condensing Hydrogen
- Rate of Uncatalyzed Conversion of the Ortho-Para Hydrogen
- T-S, H-S, H-P, and H-T Diagrams
- Equilibrium Constant for Dissociation

OXYGEN

- Vapor Pressure
- Density of Oxygen and Liquid Oxygen
- Compressibility Factor
- Specific Heat C_p for Liquid Oxygen
- Specific Heat C_p and C_v for Gaseous Oxygen
- Specific Heat Ratio for Gaseous Oxygen
- Viscosity
- Thermal Conductivity
- Internal Energy Charts
- Velocity of Sound
- Surface Tension
- Heat of Vaporization
- Enthalpy Chart
- T-S and Mollier Diagrams

NITROGEN

- Vapor Pressure
- Density of Liquid and Gaseous Nitrogen (Saturated)
- Density of Nitrogen
- Compressibility Factor
- Specific Heat C_p for Liquid Nitrogen
- Specific Heat C_p and C_v for Gaseous Nitrogen
- Specific Heat Ratio for Gaseous Nitrogen
- Viscosity
- Thermal Conductivity
- Velocity of Sound
- Surface Tension
- Heat of Vaporization
- Equilibrium Diagrams for Oxygen-Nitrogen
- T-S and Mollier Diagrams

MISCELLANEOUS

- Specific Heat of Titanium
- Thermal Conductivity of Titanium, Teflon, and Stainless Steel
- Heat Capacities of Aluminum and Stainless Steel

(continued overleaf)

Note:

Copies of this handbook are available from:
Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
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Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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